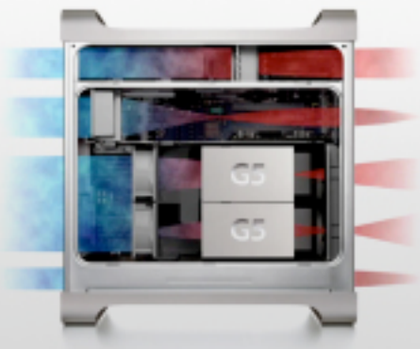
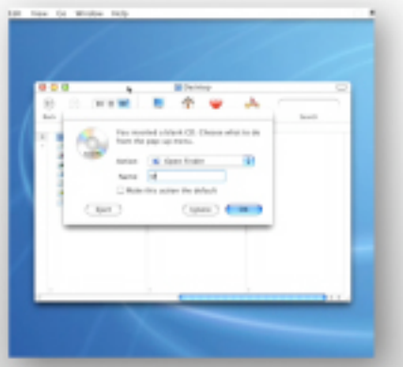
Wireless Directions

Session 500





Wireless Directions

Lars Rehder
Product Manager—Wireless Technologies

Agenda

- Wireless update
  - 802.11 technology
  - AirPort Extreme update
  - Bluetooth
- Taking wireless to the next level
  - Opportunities
- Q&A

Wired/Wireless Matrix

	Wired	Wireless
Network	Ethernet	AirPort Extreme 802.11g 802.11b
Peripheral	USB FireWire	Bluetooth

Wireless Update 802.11

AirPort Extreme

802.11g

- Delivered on promise made last year
  - 802.11g is now an IEEE standard

802.11g

RATIFIED

- Delivered on promise made last year
  - 802.11g is now an IEEE standard

802.11g

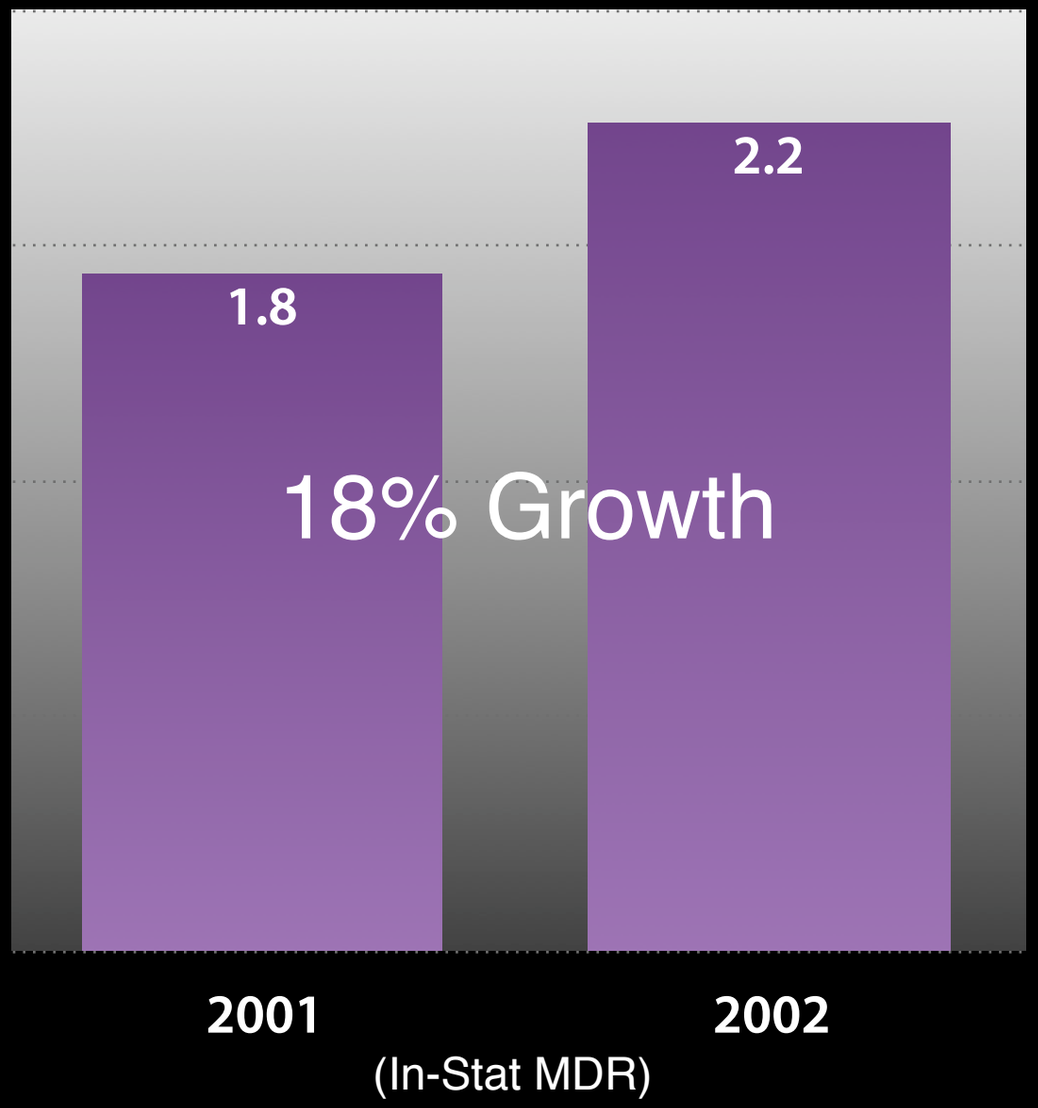
RATIFIED

- Delivered on promise made last year
  - 802.11g is now an IEEE standard
- Next-generation high-speed wireless protocol
  - Up to 54 Mbps
  - Supports bandwidth-intensive media
  - Compatible with 802.11b
    - Use supported worldwide
    - Operates in 2.4GHz frequency band
  - Mac and PC and handheld compatible

802.11 Momentum

802.11 Business 2001–02

802.11 Revenue
US$ Billion

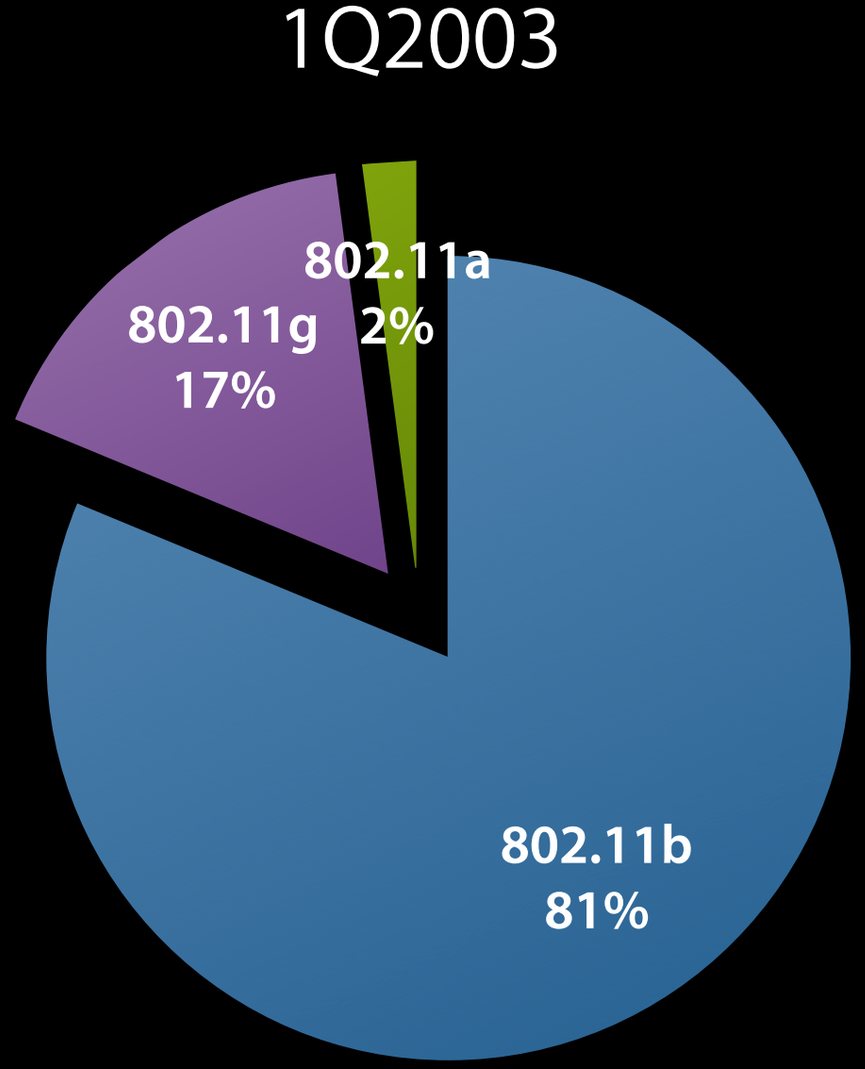


802.11b
2002 Shipments

11.6 Million

(In-Stat MDR)

Shipments This Year



4.8 Million

(Dell'Oro Group)

802.11 Product Momentum

Notebook Computers Drive 802.11

802.11 Product Momentum

Handhelds	**Phones**	**Appliances**

New Device Categories Coming Online

Macintosh User Adoption

AirPort

Over 2 million sold

AirPort Extreme

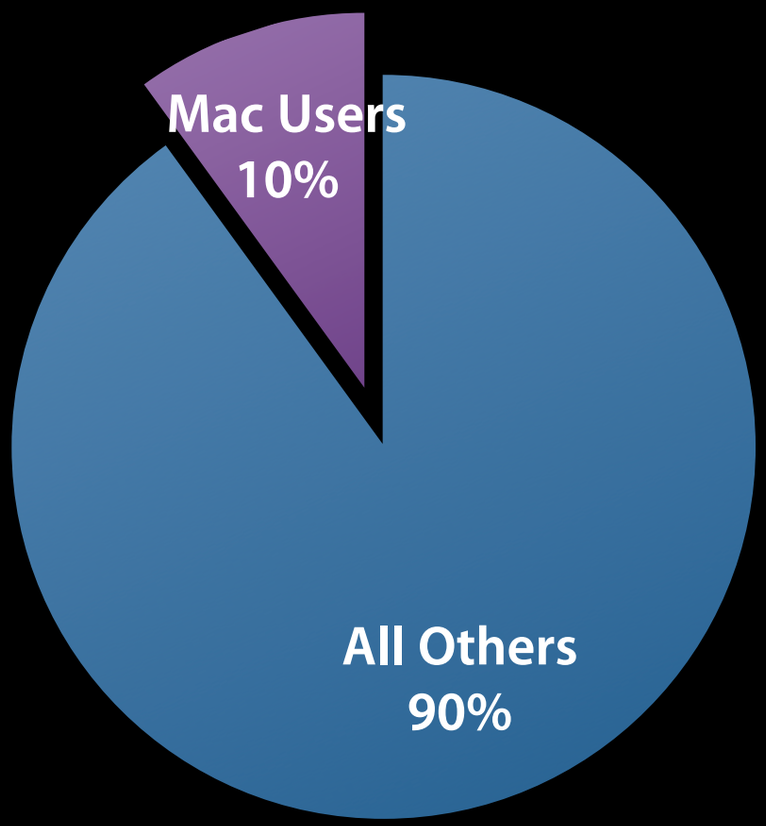
Over 150,000 sold in 1Q03

AirPort Business

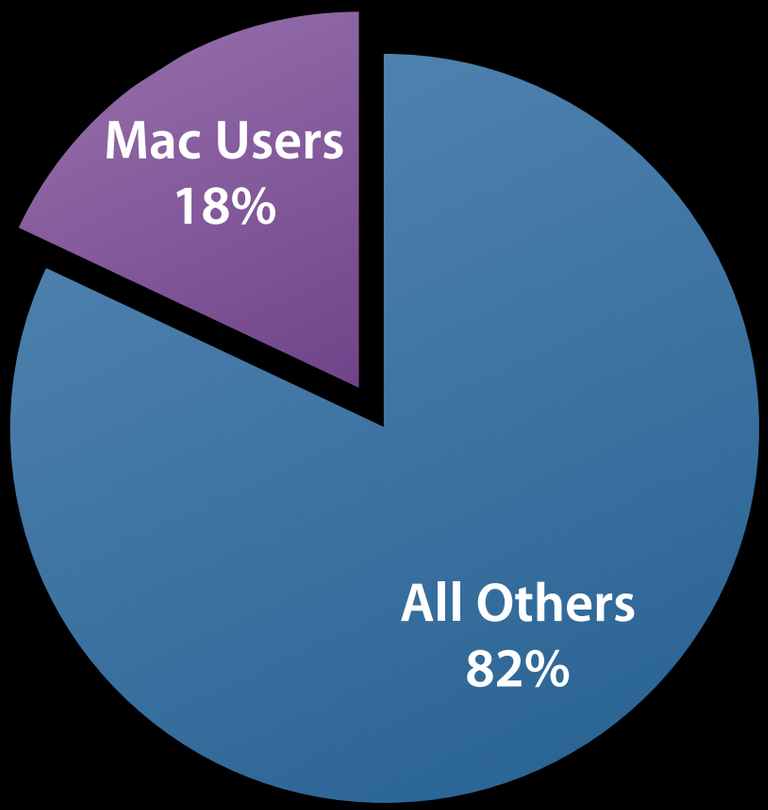
Nearly doubling year for year

Shipments to Macintosh Users

802.11b



802.11g



Locations

1999–2002 Wireless Locations

Homes	**Education**	**Businesses**

Today More Locations Than Ever

Cities	**Aircraft**	**Pay phones** **Coffee shops** **Bookstores**

So Where Is It Going?

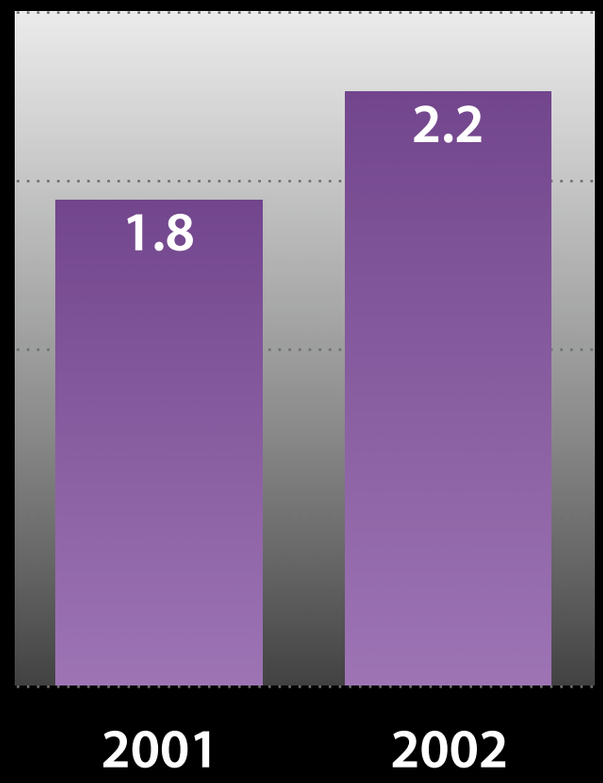
802.11 Review

802.11b	802.11g	802.11a

802.11 Take Aways

802.11 Take Aways

- Business is good



802.11 Take Aways

- Business is good
- New product categories

802.11 Take Aways

- Business is good
- New product categories
- More places to connect

802.11 Take Aways

- Business is good
- New product categories
- More places to connect
- Lots of momentum

AirPort Software Update

Paul Rekieta
Engineering Manager—AirPort Software

AirPort Software 3.1 Update

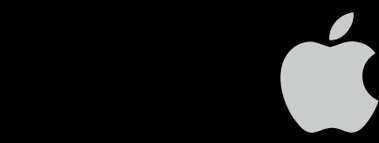
- Performance
- Robustness
- WDS setup
- SNMP
- UTF-8

AirPort Extreme Performance

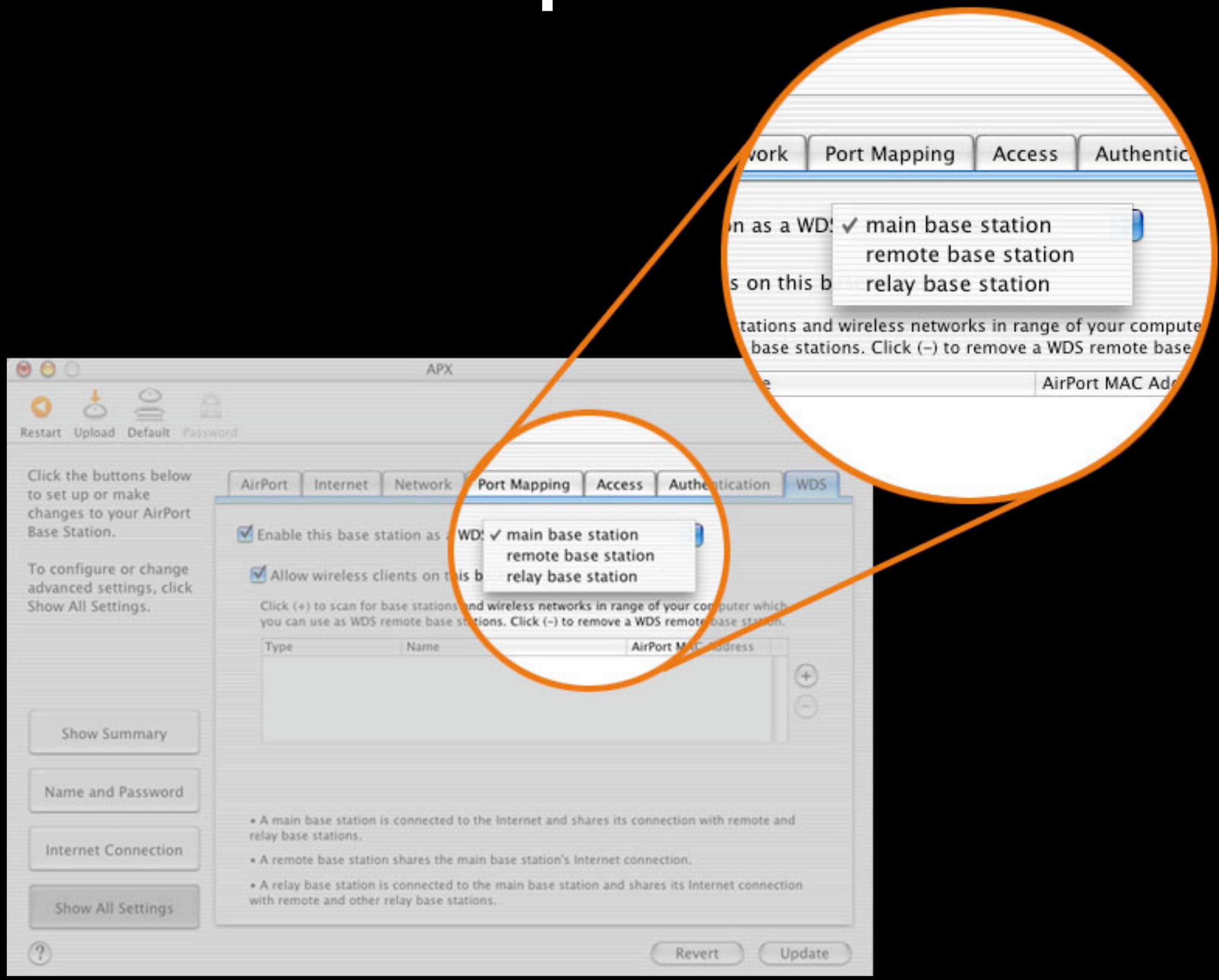
- Improvements based on new standard
- Common myths
  - 802.11b clients spoil the network for everyone
  - Nearby 802.11b networks reduce your speed
- Improve 802.11g performance in presence of 802.11b
  - Frame bursting
  - RTS/CTS Protection mechanisms

Robust Connections

- Automatic channel selection
  - Looks for best channel at boot time
- Interference Robustness
  - Other nearby 802.11 networks
  - Cordless phones
  - Video distribution systems
- Automatically returns to faster speed when source of interference goes away



Easier WDS Setup

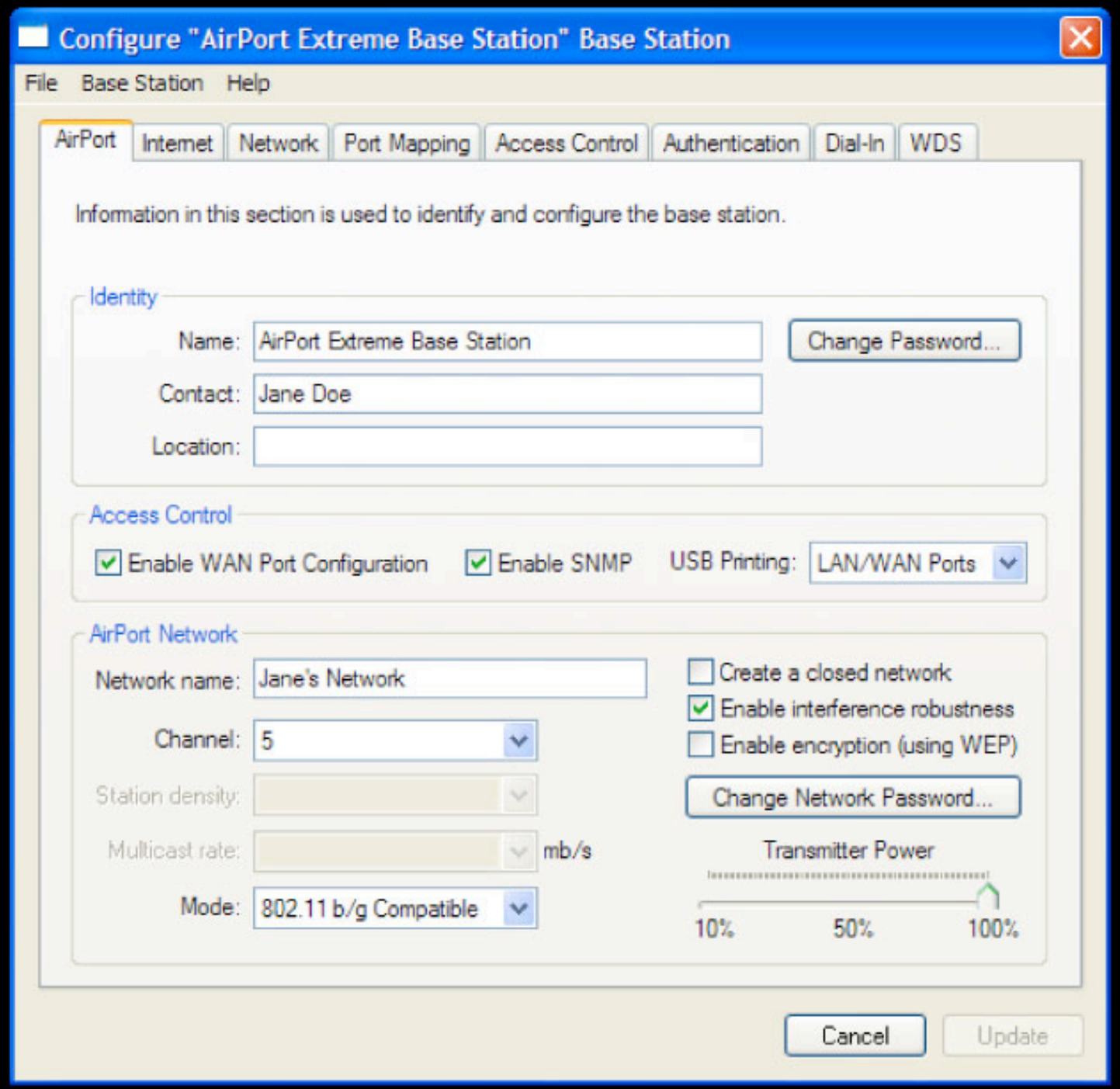


AirPort Administration Tools

- Ability to set the DHCP range
- Ability to set the multicast rate
- More extensive SNMP support
  - Wireless clients and WDS nodes
  - DHCP clients
  - Physical interfaces
  - And many more

International Support

Windows AirPort Admin Support



Developer Opportunities

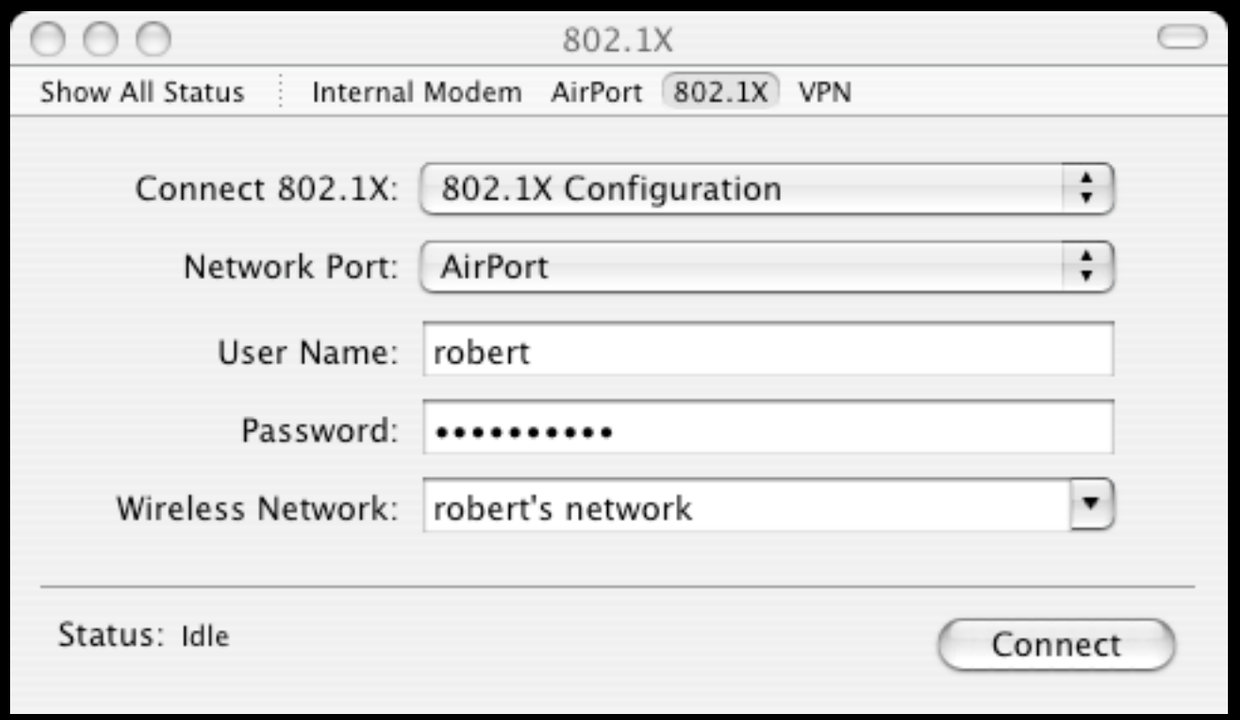
- API is available under NDA for basic client support
  - Power on/off
  - Look for wireless networks
  - Choose wireless network
  - Get status information
- Contact dts@apple.com for more information

AirPort Security Roadmap

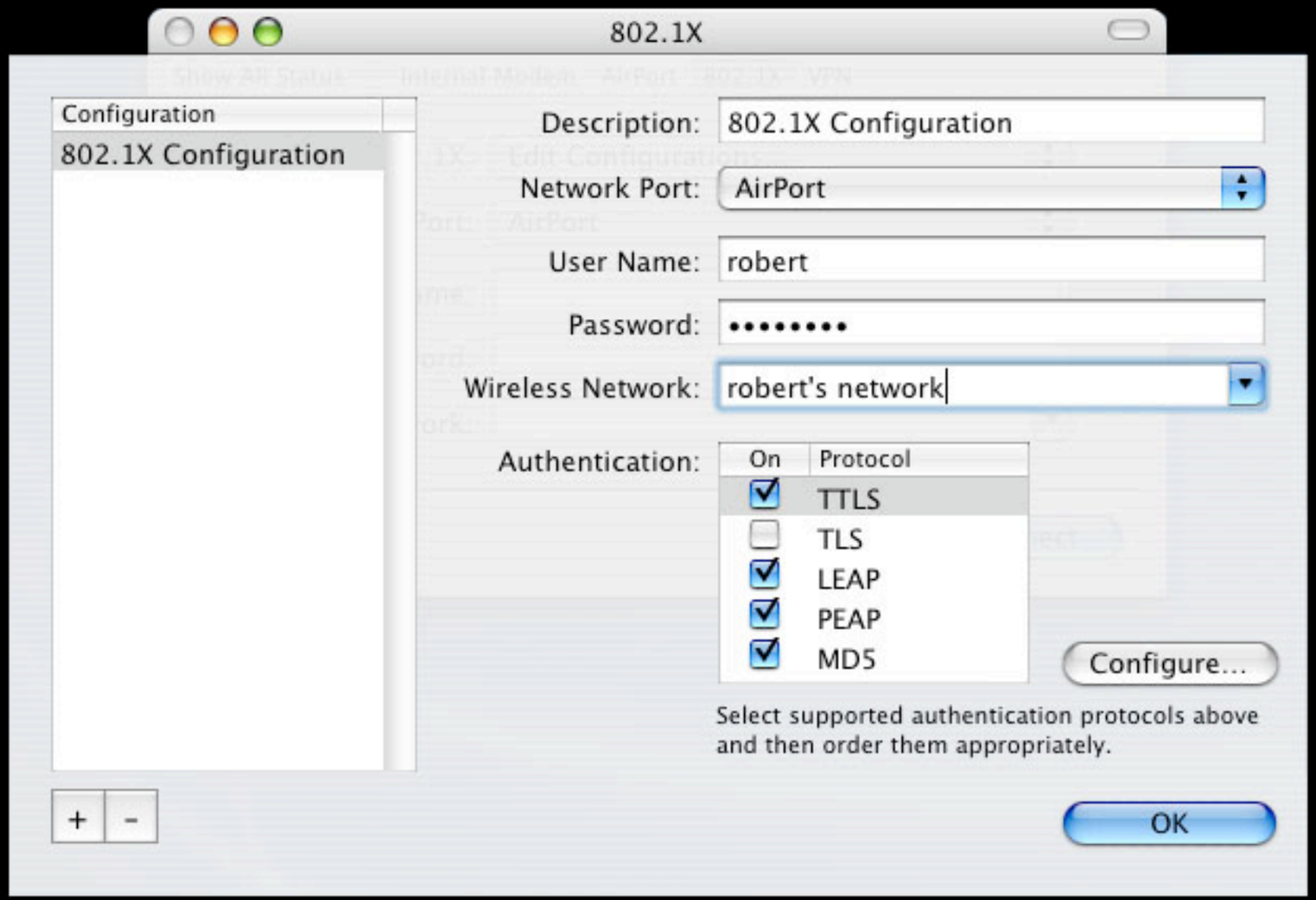
Philip Kearney
Engineering Manager—AirPort Base Station Software

Security—802.1X

- Layer 2 network security
- Authentication for wired or wireless infrastructures
- Servers include Funk, Microsoft, Cisco and others
- Send comments to 8021X-Feedback@group.apple.com



Security—802.1X



WPA

- WPA: Strong, interoperable replacement for WEP
  - Wi-Fi Alliance initiative to improve security in an interoperable manner
  - Improved data encryption (TKIP)
  - User authentication (802.1X + EAP)
  - Dynamic key distribution (802.1X)
  - Message Integrity Check (MIC)
  - WPA = 802.1X + EAP + TKIP + MIC

- Panther will include WPA support by the end of the year

802.11i

- 802.11i: The future of wireless security
- IEEE standard
- Not likely to be ratified before 2004
- Wi-Fi Alliance investigating WPA2

Wireless Update

Bluetooth

Bluetooth Unwires Peripherals

- Simple. Secure. Versatile. Reliable.

Bluetooth Progress

Time	1998–2002 Early Adoption	2003 Crossing the Chasm	2004 Going Mainstream
Shipments **(In-Stat MDR)**	20 million (2002)	57 million	128 million
Hardware	External and some Integrated	Integrated and some External	Integrated
Software	Basic Connections	Easy Connections	Transparency
Usage	Cable Replacement Networking	Cable Replacement	Cable Replacement

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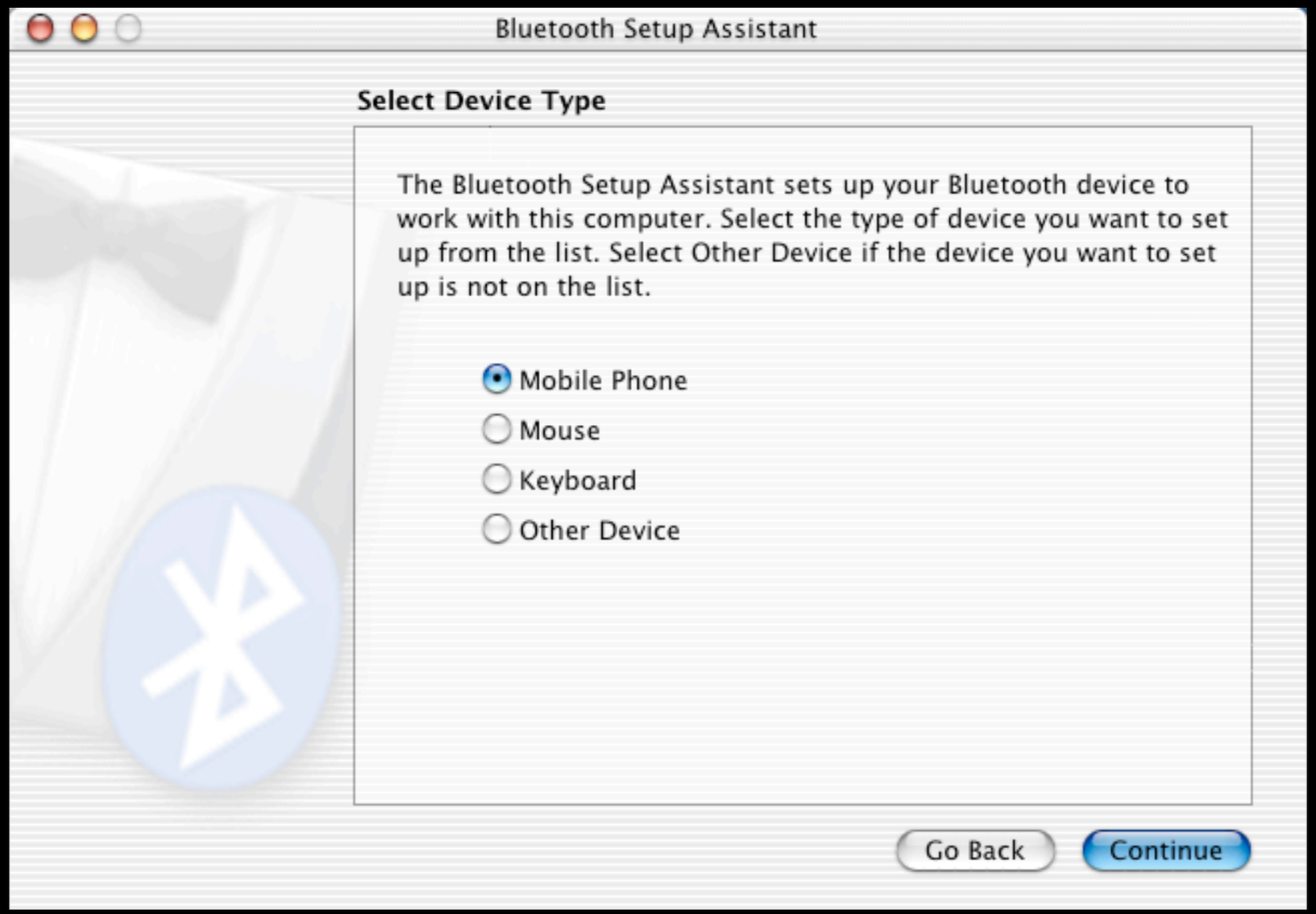
Apple’s Bluetooth Design Goals

- Make Bluetooth
  - Easy
  - Elegant
  - Useful
- How has Apple done?

Bluetooth Menu Extra

Setup Assistant



Device Filtering

Bluetooth Hardware Built-In

Bluetooth Examples

- Synchronization
- Messaging
- Remote control
- Mobile phone as modem

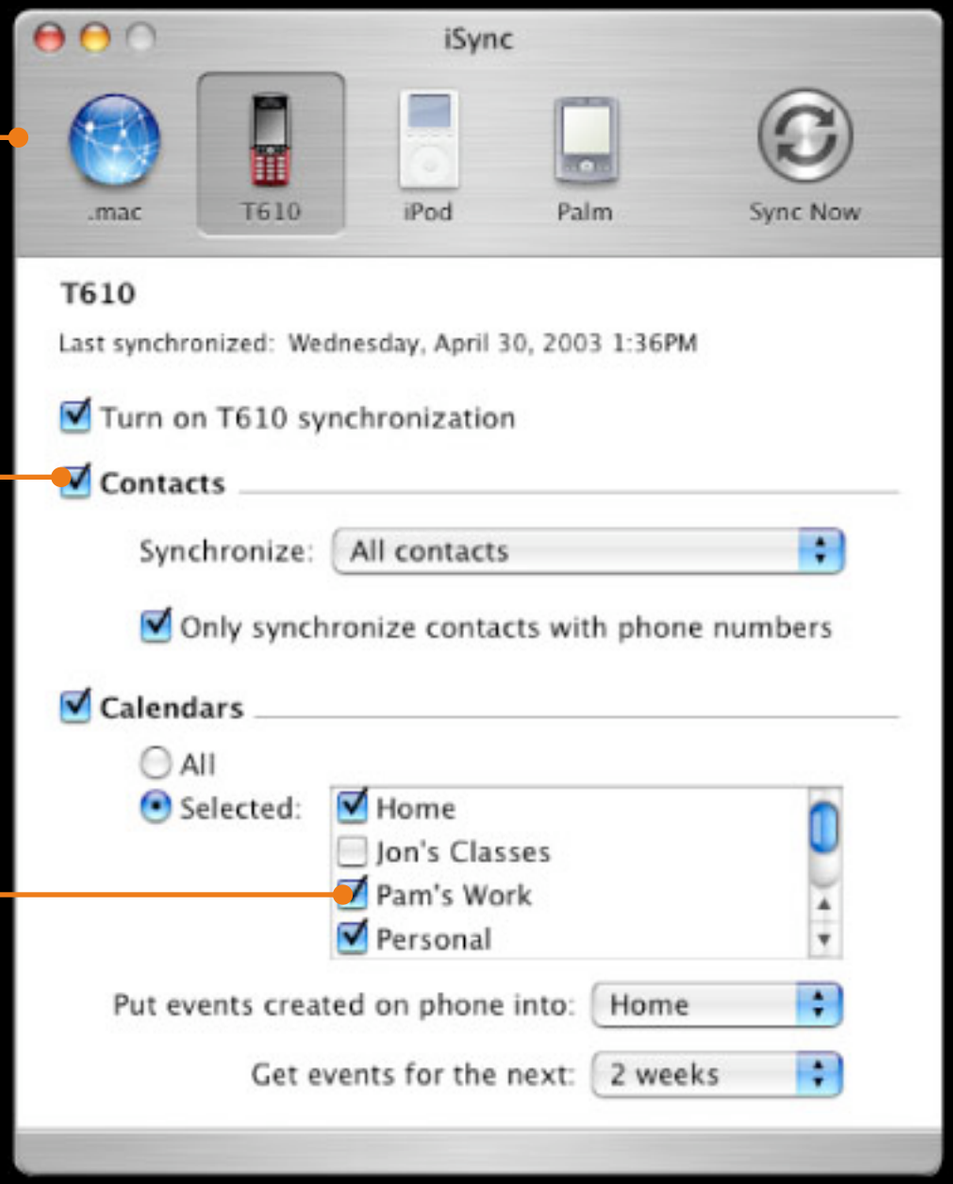
iSync

- Up-to-date information, everywhere, all the time

One application supports multiple devices

Synchronize your contacts

Synchronize your calendars



Address Book

Connect to Bluetooth phone

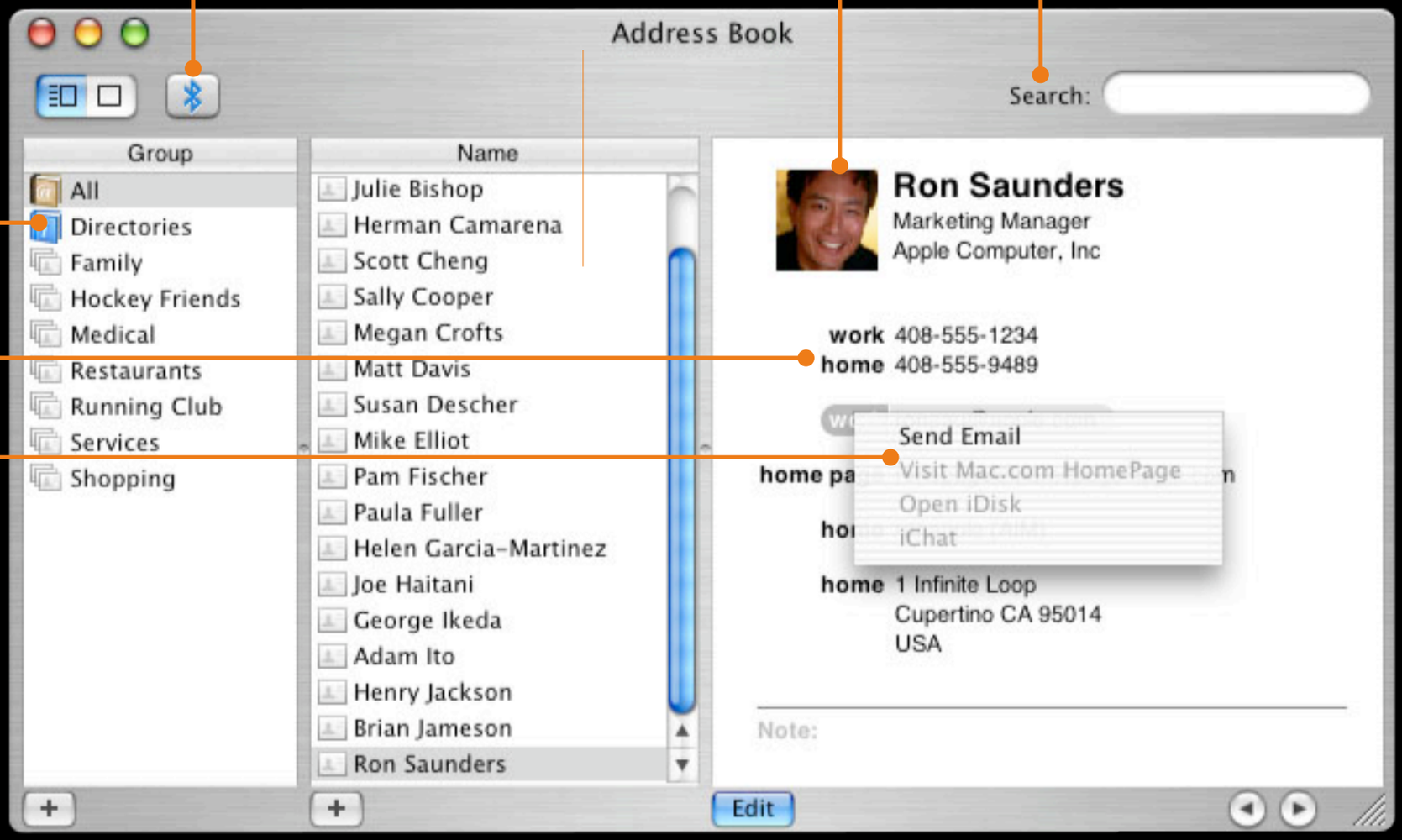
Create groups and search LDAP directories

Edit smartly

Contact people directly

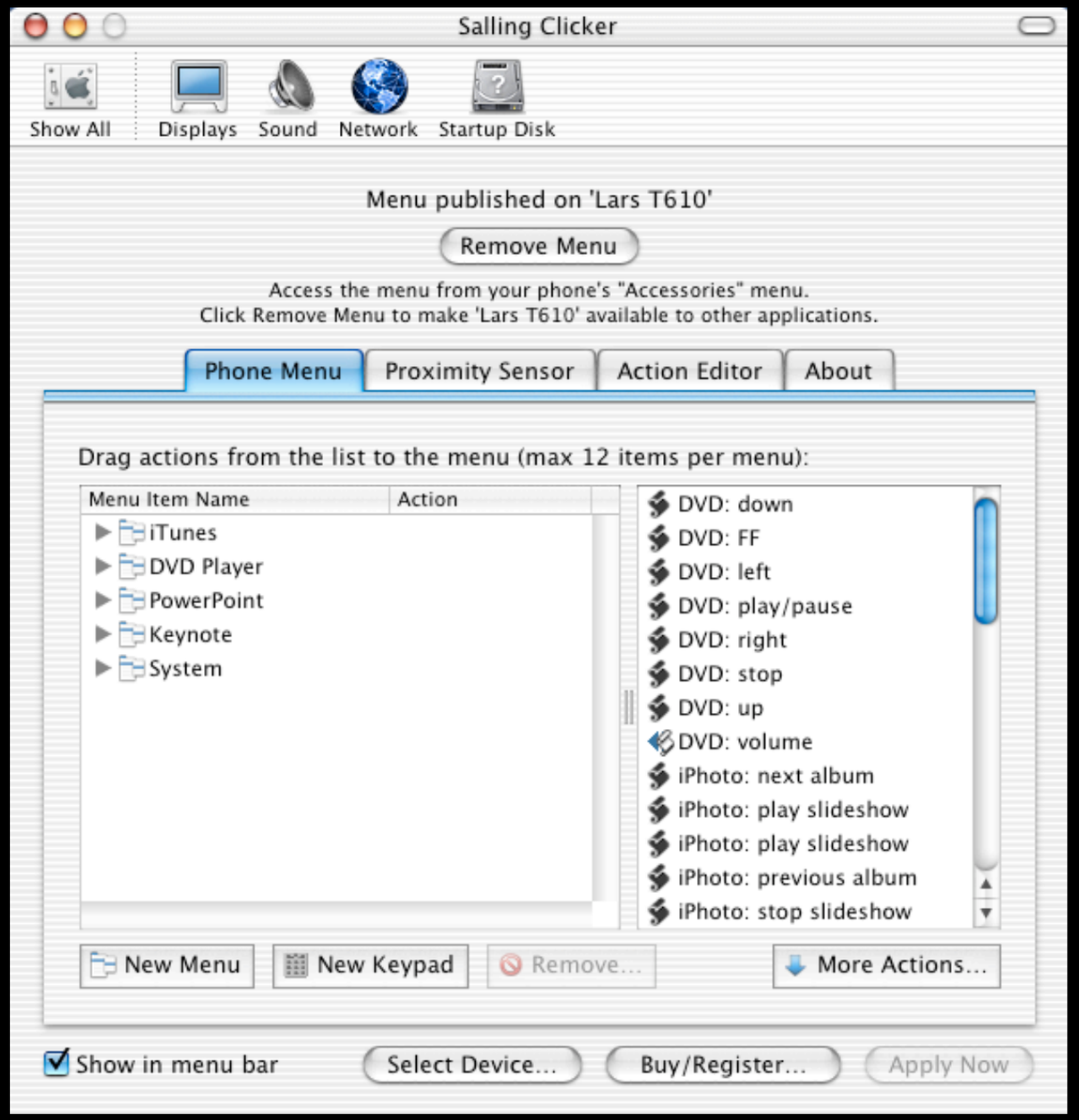
Add a picture

Search contacts instantly



Salling Clicker

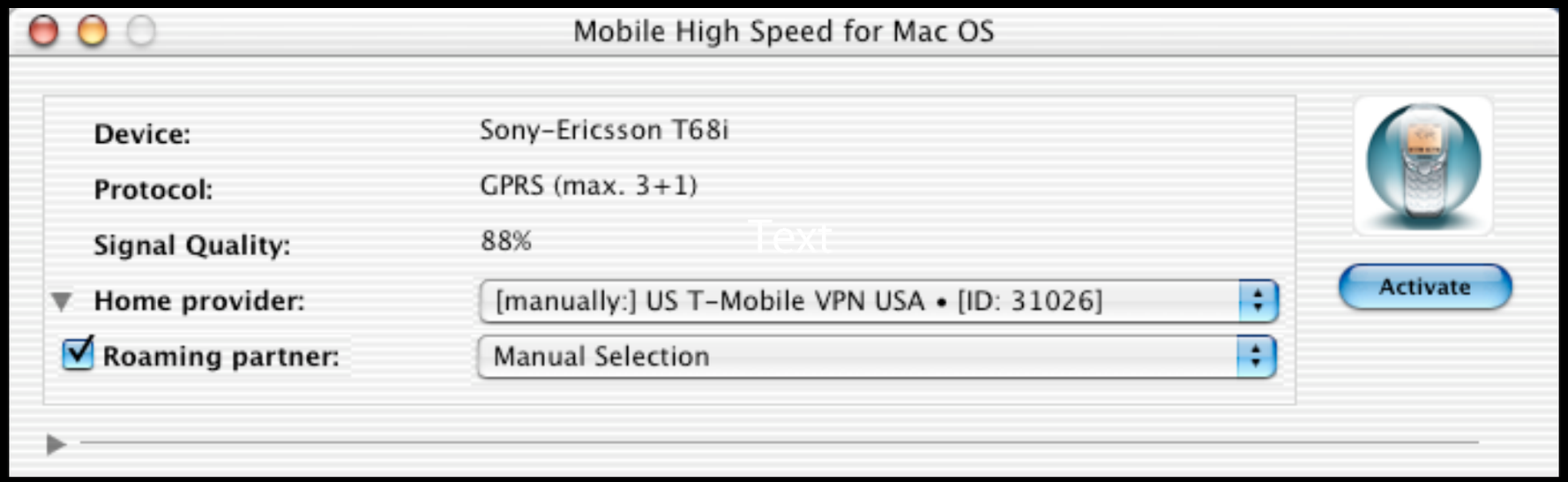
- A remote control for your Mac
  - iTunes
  - DVDs
  - Keynote
  - Power Point
  - And more



www.salling.com

Mobile High Speed

- Easy GPRS connections over Bluetooth



www.novamedia.de

Some Bluetooth Development Tips

Challenge	Tip
Bluetooth has been hard to find	Make Bluetooth like a light switch
Discovery is easy, but not always straight forward	Filter for the right type of device
Pairing is difficult	Don’t require pairing if your data doesn’t need to be secure cache connections instead
Limited bandwidth	Bluetooth is wireless USB

Wireless Reloaded

Getting to the next level…

From the User Perspective

- More wireless choices in their lives
  - Many different types
  - Lots of different things to do
  - Getting harder to keep it all straight
- Users want solutions
  - Wireless as a better way to do something
  - Want abstraction from the technology

Applications Need to Take Control

- Wireless transparancy
  - Task driven connections at the application level
  - Creating, sharing, collaborating
    - NOT connecting, associating, or discovering
- Bandwidth efficiency
  - Know what connections are needed
  - Adjust features accordingly

Meeting Places Today

- Connecting people
  - Share
  - Collaborate
  - Create

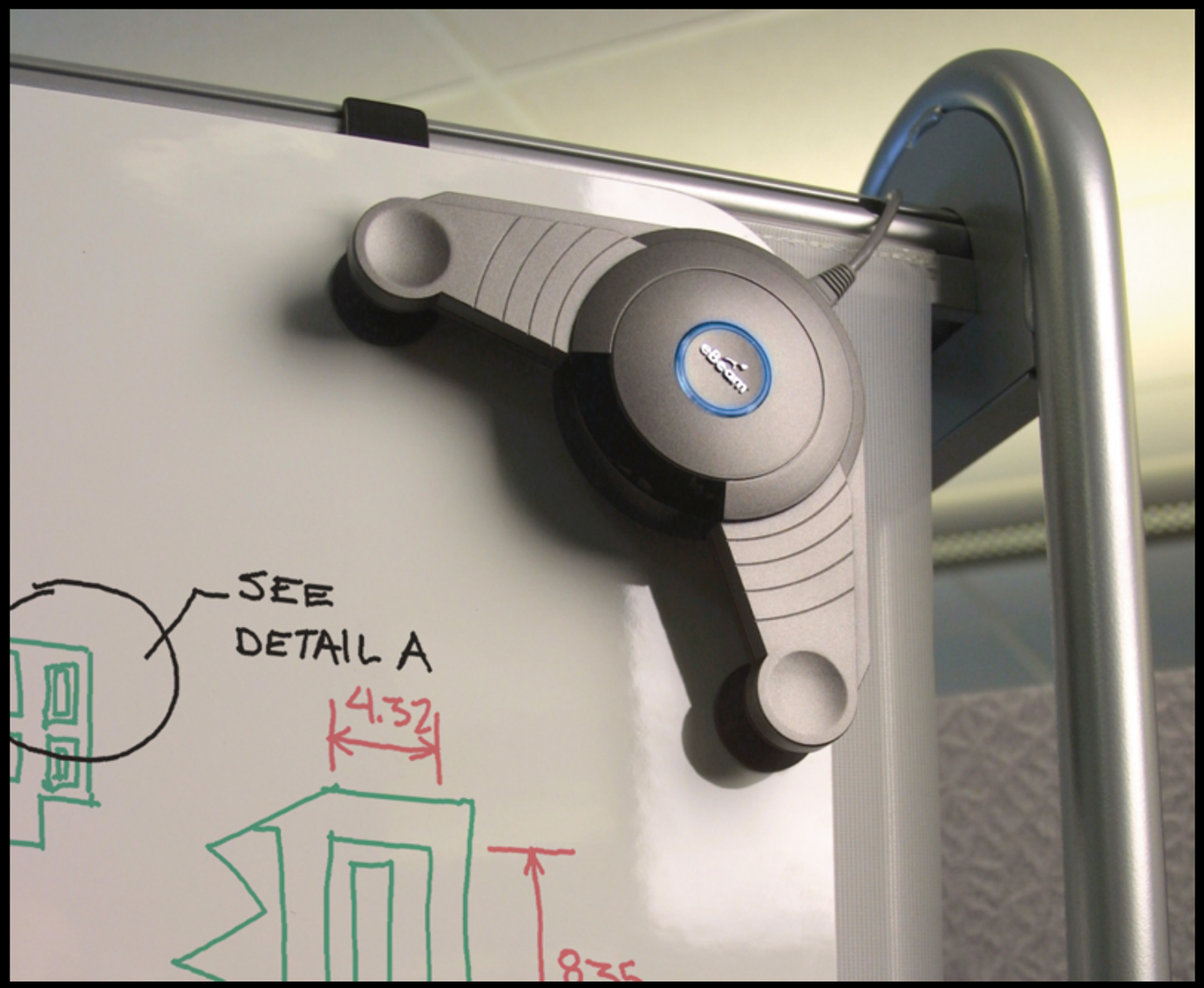
- Connecting resources
  - Equipment
  - Network
  - Devices

Some Examples of Wireless Solutions

Infocus LiteShow Wireless Projector

www.infocus.com

e-beam White Board



www.e-beam.com

Handheld

www.palm.com

Mobile Phone

www.sonyericsson.com

Where Wireless Solutions Can Go

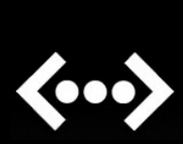
- Today
  - It is about connecting my stuff
- Tomorrow
  - With transparency and application awareness
  - It can be about connecting my stuff to your stuff
- Collaboration
  - Untapped solution area with potential

In Summary

What Have We Learned?

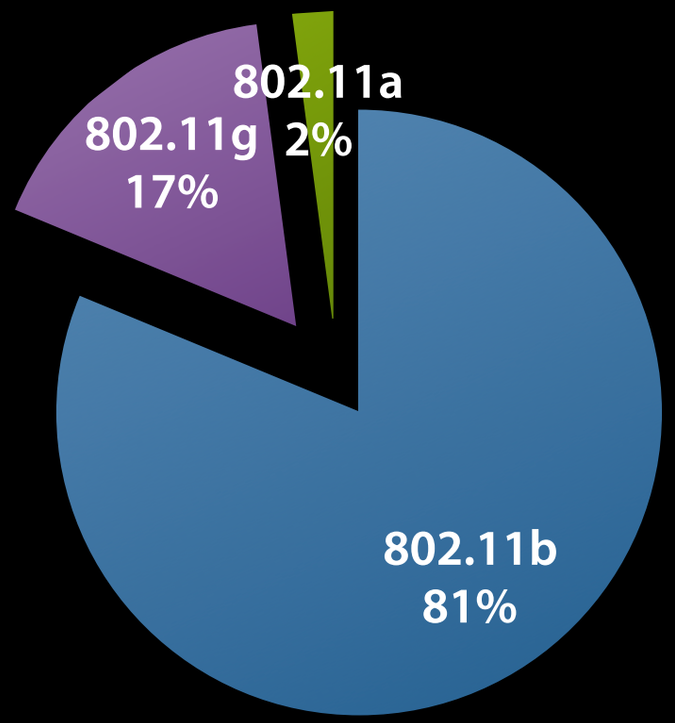
What Have We Learned?

- Remember the matrix

	Wired	Wireless
Network	 Ethernet	AirPort Extreme 802.11g and 802.11b
Peripheral	USB FireWire	Bluetooth

What Have We Learned?

- Remember the matrix
- Mac users love wireless



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What Have We Learned?

- Remember the matrix
- Mac users love wireless
- 802.11 has momentum
- AirPort 3.1 Rocks!
- Bluetooth is on the rise
- Wireless transparency is key

For More Information

Reference Library

Documentation

Bluetooth SDK
ADC Home > Documentation > Hardware >

Other Resources

Official 802.11 Site
http://www.wi-fi.org/

Official Bluetooth Site
http://www.bluetooth.org/

Bluetooth Development Mailing List
http://www.lists.apple.com/mailman/listinfo/bluetooth-dev

Roadmap

110 Networking
Overview of Mac OS X Networking APIs

Mission
Thur., 10:30am

501 Bluetooth Update
Technology that enables wireless connections

Marina
Tues., 9:00am

721 WiFi and 3G: Let the Games Begin
Creating wireless Hotspots

Haight/Ashbury
Wed., 5:00pm

Q&A

http://developer.apple.com/wwdc2003/urls.html

WWDC 2003

Worldwide Developers Conference